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GEOGRAPHIC SCHOOL BULLETINS

Published Weekly by

THE NATIONAL GEOGRAPHIC SOCIETY

(The National Geographic Society is a scientific and educational Society, wholly altruistic, incorporated as a non-commercial institution for the increase of geographic knowledge and its popular diffusion. General Headquarters, Washington, D. C.)

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A HORNBILL HALO HELPS THE DROWSY WARRIOR LOOK FIERCE

A favorite headdress for natives of northeast New Guinea is made of the bones of the hornbill, which ranks beside the giant pigeon and the bird of paradise among New Guinea's weird birds. Other ornaments are beads, shells, and string made from grass fibers and hibiscus bark. This warrior is all dressed up with nowhere to go . . . except to sleep. He is chewing a betel nut preparation which induces drowsiness. The betel nut, fruit of the areca palm tree, is mashed with peppermint leaves and mixed with a dash of lime in a globular lime pot. He dips the preparation out with a stick. Tribesmen around Madang, decked out in shells for phony ferocity, have seen their palm groves and gardens invaded by the real ferocity of modern war (Bulletin No. 1).

Frank Hurley

GEOGRAPHIC SCHOOL BULLETIN

HOW TEACHERS MAY OBTAIN THE BULLETINS

The Geographic School Bulletins are published weekly throughout the school year (thirty issues) and will be mailed to teachers in the United States and its possessions for one year upon receipt of 25 cents (stamps or money order); in Canada, 50 cents. Originally entered as second-class matter January 27, 1922; re-entered as of April 27, 1943, Post Office, Washington, D. C., under Act of March 3, 1879. Copyright, 1943, by National Geographic Society, Washington, D. C. International copyright secured. All rights reserved. Quedan reservados todos los derechos.

New Guinea Battlefields Leap from Jungle to Headlines

THE world's second-largest island, embattled New Guinea, has room for many battles. The coast is indented with coves and gulfs, the interior is partitioned by mountains, so that each battlefield is isolated.

Three sites on the island's northeast coast, where bitter fighting got under way last month, seem remote from one another. But they are related, nevertheless, as moves in the strategy of surrounding the Japanese on New Britain Island. The three spots are Madang, due west of New Britain; Finschhafen, southwest; and Oro Bay, due south of that Japanese base.

New Guinea's northeast coast is scalloped with palm-fringed crescent gulfs and bays. Madang stands beside Astrolabe Bay, toward which off-lying New Britain points like an arrow. Finschhafen is 175 miles southeast, at the northern entrance to Huon Gulf, on the shores of which stand Lae and Salamaua. Oro Bay cuts into the coast 175 air miles farther southeast, an inlet within and near the western limit of the larger Dyke Acland Bay.

Madang Was Peacetime Copra Center

Madang's harbor ranks with the best on New Guinea's northern coast. Small wooded islands protect it. Mount Hanseman rises nearly 1,500 feet to guide ships through the harbor's entrance, Dallman Pass. This was one of the first New Guinea spots captured by the Japanese.

The town of Madang, one of northeast New Guinea's largest, had a prewar population of 42 whites, 200 natives, and 50 Chinese. It then had a radio station, hospital, hotel, and several stores and warehouses. Madang is the center for a rich plantation area comprising several thousand acres of coconut groves (illustration, next page). Copra was the chief export in peacetime.

Madang originated in the 1890's as headquarters for the German government of northeast New Guinea, a German protectorate after 1884, known as Kaiser-Wilhelmsland. The territory was mandated to Australia after World War I.

Finschhafen: A German Name on New Guinea Shores

Sounding as if it should be in Germany beside Friedrichshafen, Finschhafen is a New Guinea port with a left-over German name. The town was made the district's first capital when the flag of Germany was raised over New Guinea in 1884, just ten days after a British protectorate was proclaimed over the island's southeast coast.

The New Guinea Company, chartered in 1885 and given sovereignty over northeast New Guinea by Germany, established its base at the Finschhafen site.

Finschhafen was headquarters for missions supported by Lutherans of the United States and Australia. They carried on work begun in 1886 by a Bavarian.

Finschhafen owes its excellent harbor to Nugidu Peninsula, which stretches northward for two miles parallel with the mainland and encloses three basins connected by narrow channels. The northern basin and the entrance roadstead can accommodate the largest ships.

The port's white buildings stand between sandy beaches and densely wooded highlands that slope up to mountains more than 7,000 feet high. Dairying and boat-building figured among the town's peacetime activities.

UMI

Ewing Galloway

ROCK-WALLED VALLEYS AND WINDING MOUNTAIN ROADS MAKE DALMATIA A FORTRESS THAT NATURE BUILT

Yugoslav guerrillas fighting in Dalmatia find the mountains an ally against Axis forces trying to hold coastal ports. Mountain caves and hidden valleys serve as hideaways; winding mountain roads and narrow trails can be defended against the intruding enemy. These crags have helped in earlier wars; the mountaintop castle (left) was a fortress in the struggle against Turkish warlords. At the foot of Monte Mosor (right) lies the town of Klis (Clissa), a station on the railway across Dalmatia. The single-track line (lower right) winds across the valley to the important port of Split (Spalato). This prewar photograph shows Dalmatian highlanders peacefully going down to the town on their market errands (Bulletin No. 2).

good round coconuts in the nursery, transplant the seedlings, and collect the 50 to 100 coconuts a good tree may yield in a year.

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Dalmatia: Geography's Gift to Guerrillas

ACROSS the Adriatic Sea from embattled Italy, the Dalmatian coast of Yugoslavia suddenly took on a special military significance when Yugoslav guerrillas began to fight bitter battles with Nazi armies for the country's ports. Recently the guerrillas have been aided by Allied bombing planes.

Dalmatian shores are near Italian battlefields. From Bari on the heel of Italy's boot, held by the Allies, the distance is about 120 miles.

With Italy's coast in Allied hands, Dalmatia on the opposite shore might be the key to control of the whole Adriatic Sea.

Cliffs, Caverns, Coves, and Mountain Trails

Dalmatia was a crown-land in the old Austro-Hungarian Empire. This region joined with other sections of the crumbling empire in 1918 to form the new nation of Yugoslavia. Now the name usually applies to a 250-mile strip of coast reaching roughly from south of Dubrovnik (Ragusa) to northwest of Split (Spalato).

Ranging in width from two to forty miles, Dalmatia proper has an area of less than 5,000 square miles, roughly matching Connecticut. But the region is a highly important slice of Yugoslavia, because of its numerous ports.

The terrain of Dalmatia might have been constructed by geography with guerrilla warfare in mind. It is all sea and mountains, and the mixture is inhospitable, when not downright dangerous, to strangers. With its front door on the sea and its back door in the mountains, it offers ready escape to hit-and-run guerrilla raiders. Unlike the smooth sweep of unindented coastline of Italy to the west, Dalmatia's coast is rugged and broken, flanked by a guardian fleet of islands. In places the mountains drop sheer into the sea, raising high walls about deep inlets like Norway's fjords. The mountains are carved into ravines and caverns.

Fishermen and Shepherds Know Their Countryside

The dreaded bora—a cold, swift, and unpredictable wind—sweeps along the shores of Dalmatia and Albania. It has been known to rush through a mountain gorge with such force as to hurl a passenger train off the tracks.

No railway and few roads skirt the Dalmatian coast. The two rail lines crossing Dalmatia to the coast come through mountain passes from central Yugoslavia. These lines branch to reach the sea at Sibenik, northwest of Split, at Split itself (illustration, next page), and at Dubrovnik, far to the south. Natives travel by winding mountain trails (illustration, inside cover).

Dalmatia is sparsely settled, as contrasted with the populous shores of Italy across the Adriatic. Chiefly barren mountain slopes, the region supports six to seven hundred thousand people. The Dalmatians normally make their living through fishing and raising sheep and cattle. Both fishermen and herdsmen must know the lay of the land, and can aid the secret operation of guerrilla bands.

Despite the physical difficulties of its terrain, Dalmatia has a long and bitter history of conflict. It is a meeting place, though not a melting pot, for the sharply contrasting cultures of East and West—the result of struggles between Rome's Eastern and Western Empires, between Slav and Latin, Christian and Moslem. It has fallen in turn under the power of Greeks, Romans, Goths, Hungarians, Turks, Venetians, Austrians, and Frenchmen.

Two Dalmatian areas, the mainland city of Zara and the island of Lagosta,

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Oro Bay Named When Gold Was the Goal on New Guinea

Oro Bay, where Allied airmen destroyed a staggering number of attacking Japanese planes, is an indentation in the coast of Dyke Acland Bay, so named for a British baronet by explorer Captain John Moresby 70 years ago. Around the bay stretches the densely wooded coastal plain, backed by lofty inland mountains, which is typical of the entire northeast coast of New Guinea.

At the head of Oro Bay stands a native village. Inland trails lead to areas from which some gold has been taken. The bay is named for the metal that inspired early explorations in the region. New Guinea itself was named "Isla del Oro" by the Spaniard Saavedra in 1528, and was so known until renamed in 1545.

NOTE: New Guinea may be located on the National Geographic Society's Map of Asia and Adjacent Areas. A price list of maps may be obtained from the Society's headquarters in Washington, D. C.

See also: "Treasure Islands of Australasia," in the *National Geographic Magazine* for June, 1942*; "Into Primeval Papua by Seaplane," September, 1929*; and these GEOGRAPHIC SCHOOL BULLETINS: "The Buna-Gona Sector of the New Guinea Front," January 4, 1943; "Rain Hampers Both Sides in New Guinea Battles," November 16, 1942; and "Gold and Savages on New Guinea," March 30, 1942. (*Issues marked by an asterisk are included in a special list of Magazines available to teachers at 10¢ each in groups of ten.*)

Bulletin No. 1, November 8, 1943.

Dr. E. W. Brandes

MADANG'S HINTERLAND IS PLUSHLY UPHOLSTERED WITH COCONUT GROVES

The copra exports which built Madang to its present size came from a strip of coconut plantations between sea and mountains on either side of the town. The best coconut land is flat, well-drained, sandy loam, found along the land edge of beaches and on river flats. Thousands of acres along New Guinea's northeast coast are covered with groves of coconut palms, the trees planted about 33 feet apart. The regular pattern of palm tufts appears from the air to form a soft upholstery covering for the island. This plantation is seamed with a straight lane and winding streams. In three small clearings are villages of rectangular native houses (center and upper left). Native workmen clear the plantation of kunai grass and insect pests, plant good round coconuts in the nursery, transplant the seedlings, and collect the 50 to 100 coconuts a good tree may yield in a year.

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General Headquarters, Washington, D. C.

Jute, a Cinderella Fiber

THE United States is buying from India millions of yards of burlap, the coarse fabric woven from jute which is now the world's major jute product. Burlap bags are needed for tons of coffee, sugar, grain, seed, cattle feed, and for baling cotton.

A century ago such purchases would have had to be made from Dundee in Scotland. Like many Scottish cities, Dundee, third largest, had textile mills. The majority of them wove linen from flax. Jute, which clipper ships brought to Dundee from India, was at first found unsuitable for fabrics. It was stronger and cheaper than flax, but it lacked the natural moisture to make it pliable for spinning.

Burlap Bags Take over from Sacks of Flax

Dundee was a whaling center. In 1832 it was discovered that whale oil softened jute enough for spinning by power machinery. Whale oil greased the industrial progress of the "Cinderella of fibers" and provided the sackcloth foundation of Dundee's prosperity. Her textile wealth built the immense stone "jute palaces" along the Firth of Tay.

By 1835 Dundee's mills were turning out jute yarns. Three years later they were weaving the yarns into burlap. Burlap bags were substituted for flax shipping sacks when the Crimean War in 1854 cut off imports of flax from the main source, Russia's Baltic provinces. Jute proved the best substitute for flax, and Dundee's burlap industry boomed.

As with flax, so with cotton. When the Civil War stopped the South's cotton shipments, Dundee's mills worked overtime to supply the demand for burlap.

Up to the middle of the 19th century, Dundee had had a monopoly on the jute industry. In 1855 India went into the business. With cheaper labor, she helped to break Dundee's hold. Jute palaces became mere ghostly reminders of Dundee's burlap boom. But Dundee and Calcutta found friendly reciprocity in sending burlap to the linoleum factories of the Scottish city in exchange for jute machinery to convert the fiber into fabric on its native heath, Bengal.

India Spins for Others and Grows Her Own

The first power mill for spinning jute yarns in India was set up in 1855 at Rishra, 12 miles from Calcutta, and soon produced eight tons a day. Four years later the first power-loom mill for weaving burlap from jute yarn was established at Barnagore. It had 192 looms. A few years before the outbreak of World War I, India's mills were spinning more jute than she exported. They normally produce 90 per cent of the world's burlap and use more than a million tons of jute a year, providing occupation for 260,000 people.

Jute is the cheapest fiber known. Though it can grow in the United States in many southern States, the cost of labor makes its price too high to compete with Indian jute. In India, where it grows wild, it is also extensively sown and cultivated.

The plant reaches a height of 12 to 15 feet. Its slender cylindrical stalk, the diameter of a man's finger, shoots up branchless and leafless for most of its height, bursting into pale green leaves and small yellowish-white flowers near the top. It is cut when in blossom, about three months after sowing.

Jute is converted into burlap by processes much like those which turn flax into linen. The stalks are cut close to the ground, tied in bundles, and soaked in water

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were awarded to Italy after World War I. Two years ago Italy was reported to have annexed the whole region.

NOTE: Dalmatia is shown on the National Geographic Society's Map of Central Europe and the Mediterranean.

For additional information, see "Kaleidoscopic Land of Europe's Youngest King," in the *National Geographic Magazine* for June, 1939*; "Jugoslavia—Ten Years After," June, 1930*; and "Dalmatian Days," January, 1928. See also the following GEOGRAPHIC SCHOOL BULLETINS: "Dalmatia Shifts to Italy" (Geo-Graphic Brevity), October 13, 1941; and "Surrounded Yugoslavia a Victim of Geographic Position," March 24, 1941.

Bulletin No. 2, November 8, 1943.

Melville Chater

THE CHEERY MARASCHINO CHERRY IS A LUXURY TO YOU, A LIVING TO THEM

Yugoslavia's Dalmatian coast is the birthplace of the luscious maraschino cherry, a concoction now copied all over the world as a luxurious garnish for food and drink. The original maraschino is Dalmatia's wild sour cherry, the *marasca*, preserved in its own fermented juice. In peacetime sturdy mountain women, well wrapped against sea breezes and the highland bora, gather the wild cherries and bring them in hefty baskets to sell in the open-air market at Split (Spalato). The near-by Italian-ruled port of Zara in normal times is the center of the *marasca*-preserving industry. Barely a tenth of the area of rugged Dalmatia is cultivated. Mountain fields, too small and rocky for big grain crops, grudgingly support scattered fruit trees and occasional orchards, so that fruits are important to the region for food and for export.

NOTICE

In response to teachers' requests for back copies of the *National Geographic Magazine* for geography scrapbook projects and other uses, the Society offers a limited number of unspecified issues in packets of ten assorted *Magazines* at 50¢ a packet. All issues in the packets appeared originally prior to 1931. Some magazines contain maps; all contain color illustrations. Although each of the ten issues in a single packet will be different, the Society cannot promise that there will be no duplication in two or more packets.

An order blank for these unspecified packets will be supplied if requested from the Society's Washington, D. C., headquarters.

where India's first mills were established.

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Brazil's "Wild West" Mato Grosso Attracts Explorers

WITH few unexplored areas left on the shrinking globe, Brazil is realizing that it has a real frontier region, mysterious and rarely visited. An exploring expedition is pushing into unmapped areas of Mato Grosso, the second largest, least developed, and potentially richest of the twenty States of Brazil.

A law just passed in Brazil, adopting simplified spelling, makes Mato Grosso the official name of the region formerly known as Matto Grosso.

This is Brazil's "Wild West" (illustration, next page). It is remembered as the setting for the unexplained disappearance 18 years ago of the expedition of Colonel Percy Fawcett.

The new expedition is sponsored by the Brazilian Government. It intends to explore and open to colonization large parts of northern Mato Grosso untouched by such previous explorers as Colonel Fawcett, Theodore Roosevelt, and General Candido Mariano da Silva Rondon, prominent Brazilian engineer and explorer.

One of Mato Grosso's rivers is now the Rio Theodore Roosevelt, named for the twenty-sixth president of the United States as a tribute to his exploration of the stream when it was known as the River of Doubt.

"Big Woods" State Named for an Ocean of Trees

One of the objects of the expedition is to increase Mato Grosso's rubber output in order to supply the manufacturers of São Paulo and Rio de Janeiro. Increased production in the south would free more rubber from the Amazon basin farther north for export to the United States.

Mato Grosso means "big woods." The name comes from the tangled jungle growth that has been such an obstacle to explorers. The forests are thick stands of bamboo, palms, tall hardwood trees festooned with lianas and other tough vines.

These obstacles to transportation have retarded the development of Mato Grosso's immense natural resources. One railroad runs from São Paulo into the southern end of the State, to the little railhead town of Porto Esperança on the Paraguay River. But the rail gauge is not the same in all parts of the line and frequent changes of train make rail travel slow and rates high.

Few of the many rivers reaching into south-central Mato Grosso are navigable for commercial vessels. The numerous tributaries of the Amazon, with the exception of the Madeira, carry no traffic. The best water route is the Paraguay River system. Shipments over this route, however, to Brazil's coast, must traverse 3,000 down-river miles and pass through Paraguay and Argentina.

Forest products shipped out of Mato Grosso include wild rubber, Brazil nuts, and maté—the South American "tea leaves" gathered from the wild yerba maté tree. Cultivated areas produce corn, cotton, vanilla, sarsaparilla, and ipecac.

Zebus from India Flourished on Cattle Ranches

The vast expanse of isolated Mato Grosso, at the heart of the South American continent, is governed as a State twice the size of Texas. Its area exceeds 532,600 square miles.

Mato Grosso's population numbers slightly more than a half-million, including many tribes of Indians practically cut off from civilization. Thus the State has exactly one person per square mile of territory—one-twenty-fourth the population density of the wide open spaces of uncrowded Texas.

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from a week to perhaps three, to loosen the bark. Then they are beaten to separate the fibers from the bark and the woody inner portion. After the fibers are dried they are softened by soaking in whale oil, and then heckled—a process which removes the coarser parts and lays the fibers parallel. The heckle is a comb with steel teeth from one to two inches long. The fibers are run through more steel combs, emerging as a continuous ribbon called a sliver. A dozen or so of these slivers are drawn into a longer sliver by still another set of combs. The process is repeated until the strand is even; a slight twist is given it, and the "rove" is ready to be spun into yarn.

The Long and Short of Jute Both in Demand

The two principal classes of jute are long jute, made from the main part of the stalk, and jute butts, made from the thick woody butt. In the United States long jute is used in the foundation of wool rugs and carpets, for wrapping-twine, coat interlinings, upholstery webbing, linoleum backing, and in insulation for electric power-transmission cables. The butts are used for coarse yarns from which is woven bagging for cotton and other agricultural products.

Fine quality jute has a glossy golden appearance which makes it a useful substitute for human hair in making stage wigs. Although coarser and tougher than linen, jute fabrics are not as durable, as the fiber is more brittle and more easily affected by water than is flax.

Bulletin No. 3, November 8, 1943.

Richard H. Stewart

BRAZIL BAGS HER COTTON IN BURLAP FROM BENGAL

This cotton, being taken to the gin at Patos, Brazil, is packed in man-size bags. Burlap for the bags was imported from India, chiefly from the province of Bengal. The huge sacks, as tall as the men who carry them, weigh from 175 to 200 pounds. No jute is grown commercially in the Americas. The United States as well as Brazil looks to India for burlap or the jute from which it is woven, to wrap home-grown cotton. The United States, India's largest peacetime burlap customer, imported $41,950,000 worth in 1940. California used nearly forty million bags for her grain crop. Not only did India supply most of the world's jute, but its name as well. It comes from the Bengal word *jhot*, or *jhout*, used by natives of the Cuttack district where India's first mills were established.

this giant Brazilian State's area is rolling grassland well adapted for cattle raising.

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Air War Weapons Dreamed 450 Years Ago by Da Vinci

BATTLES in Italian skies today are taking place above the land where aerial warfare was invented—and forgotten—four and a half centuries ago. Experiments with bombs and airplanes were being carried out in Italy in the decades when Columbus was experimenting with a global world.

The 15th century inventor of aerial weapons was Leonardo da Vinci, an Italian now known as one of the world's greatest religious artists.

For the same warlord who commissioned him to paint "The Last Supper," Da Vinci invented a fire-bomb: a copper core bristling with explosive rockets, embedded in pitch and other ingredients which burned and released poison gas. While painting the quizzical smile of "Mona Lisa," he spent his spare time fashioning starched taffeta, willow rods, oxhide thongs, and steel springs into models for a "flying machine."

Artist Was a One-Man Arsenal

Though he is world-renowned as an artist, few of his paintings survive today, and few of those are in Italy. The cities associated with him are Florence, where he studied and taught art, and Milan (illustration, next page), where he worked as engineer, artist, and interior decorator.

As an employee of Lodovico Sforza, Milan's "boss" at the end of the 15th century, Da Vinci had military as well as artistic duties. Sforza was on the lookout for secret weapons to defend his power against rulers of the four other rival states in Italy, and the King of France as well. Da Vinci concocted some for him.

But most of Da Vinci's inventions were laughed at as too silly to try—poison gas, hand grenades, shrapnel, the parachute, demountable bridges, a "flamethrower" javelin that ignited on hitting the target, and a turtle-shaped armored vehicle (called a "covered wagon") like the modern tank.

Sforza ignored these inventions, and was overthrown by the French in 1499. The great memento of Da Vinci's years in Milan is in Lodovico's favorite church, Santa Maria delle Grazie—the mural of "The Last Supper" on a wall of the refectory.

Designed Several Models for Flying Machines

Da Vinci's "bombs" were to be dropped upon the enemy by catapult instead of by airplane, but he rated them "the most lethal machines" of their time. One was an incendiary, a self-igniting mixture of gunpowder, pitch, and turpentine in a linen case. Another was a "cannon-ball" that shot bullets through eight tubes arranged around it like spokes.

Da Vinci designed several flying machines. Neighbors said after his death that he tested one model near Florence, possibly in the spring of 1506, taking off from the top of Swan Mountain. He kept his experiments secret, recording his observations in code. There is no record of which model he tested. He failed not because he didn't understand flying, but because he lacked an internal combustion engine and fuel.

He watched birds to learn the secret of flight. He worked on problems of equilibrium, center of gravity, airfoil, and other principles that face modern aircraft designers. He worked out a theory for gliding. He chose the bat's wing as the most practical model for an airplane wing.

The "Big Woods" State deserves its name only in part. Jungles cover less than half its area. Broad plains beside the low-banked rivers become swamps in flood season, when ships may lose their way in the forests. These waterlogged sections are infested with piranhas, the sharp-toothed man-eating fish.

Much of the territory is grassland, where four million cattle graze. Cattle raising is the chief industry. Humpbacked zebus from India provide the cattle ranches with vigorous, disease-resisting animals. Hides and skin are exported.

The greatest wealth of the State is underground—untold riches of gold, diamonds, iron, manganese, platinum, sapphires, and some coal. Nearly all these products are found elsewhere in Brazil, in more accessible places.

Capital of the State is Cuiabá, near the head of navigation on the Cuiabá River, a tributary of the Paraguay. In 1718 Cuiabá was the goal of a gold rush from São Paulo. Settlers made the arduous trip by canoe down the Paraná and up the Paraguay. Cuiabá became a "wild and woolly" boom town. Now a city of 48,000, it is a dignified State capital. Corumba, in the marshy southwest, and Campo Grande, on the railroad to São Paulo, are also important Mato Grosso towns.

NOTE: Mato Grosso is shown on the National Geographic Society's Map of South America. For more information, see "Through Paraguay and Southern Matto Grosso," in the October, 1943, issue of the *National Geographic Magazine*.

Bulletin No. 4, November 8, 1943.

Charles Perry Weimer from *Three Lions*

DINNER TIME BRINGS COWBOYS TO THEIR HOME ON THE MATO GROSSO RANGE

In Brazil as in Texas, the cowpunching scene is complete with boots and saddle, horse, ranch house, cactus, and windmill. The Brazilian accent in this Mato Grosso scene, however, appears in the swashbuckling sash with steerhide fringe, the zoot-suit trouser legs, and the tropical palm trees. The cowpuncher, or vaqueiro, is engaged in Mato Grosso's biggest business, for much of this giant Brazilian State's area is rolling grassland well adapted for cattle raising.

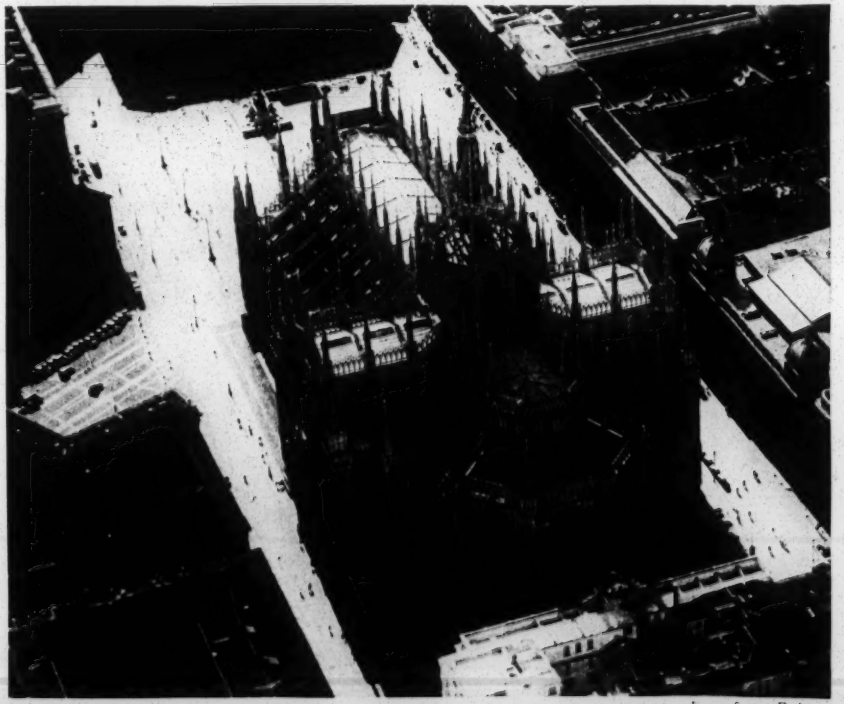
One of his flying machines resembled an ironing board with wings. The flyer was to operate it lying down—the position Orville Wright took when he made his successful flight 400 years later.

Another Da Vinci model had four movable wings that were made to flap in pairs by ropes and pulleys; the flyer stood in a suspended gondola. The landing gear consisted of ladders instead of wheels. A third design resembled today's helicopter. Instead of wings it had an overhead propeller shaped like a modern steamship's screw.

Left 7,000 Unpublished Pages

Death in 1519 defeated Da Vinci's plan to edit and publish his researches on such scientific subjects as flying, anatomy, meteorology, and military engineering. The military foresight of this 15th century genius was not recognized until the recent deciphering of 7,000 illustrated sheets of his notes, most of them stored in the Ambrosian Library in Milan. From his diagrams and descriptions several hundred working models of his inventions were constructed and exhibited in Milan before the war. About 275 of these models were displayed in New York City late in 1940.

Bulletin No. 5, November 8, 1943.



Luce from *Enit*

THESE LOFTY PINNACLES FASCINATED THE MAN WHO TRIED TO FLY

Milan's white marble Gothic cathedral, begun in 1386, was unfinished when Leonardo da Vinci worked in the city. Gothic architecture was considered a little old-fashioned, but the authorities could think of no way to finish the structure. Da Vinci said it was a "sick cathedral; it needs a physician-architect." He submitted a plan for completing the dome and central tower, along with a carved wooden model. After three years of uncertainty, it was rejected and Giovanni Amadeo's plan was adopted. Da Vinci's architecture, like his flying machine, was too far ahead of his time. The cathedral was still unfinished in Napoleon's time. Now it has 135 pinnacles, and its central tower rises 354 feet. It is Europe's third-largest cathedral.

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